Claims

1. (currently amended) An apparatus for reducing pressure in a carrier line ~~such as natural gas pipelines~~ and capturing the resultant waste energy and coolant through the production of a processed gas, said apparatus comprising:

a flow converter for gaseous communication with a carrier line, wherein the flow converter produces a pressure drop, the flow convertor including ~~w~~herein a first end ~~of said flow converter accepts~~ configured to accept a high pressure pipeline gas in a primary stream~~, there is a pressure drop through the flow converter~~ and ~~then~~ release a lower pressure pipeline gas ~~is released from a~~ at a second end of said flow converter to a carrier line;

a water extractor in communication with said carrier line;

an electricity generator mechanically linked to said flow converter for transforming at least a portion of the excess energy resulting from the pressure drop into electrical energy; and

a processed gas generator electrically linked to said electricity generator for the production of ~~a~~ the processed gas, such that ~~in use,~~ at least a portion of the energy released from the pressure drop is captured and utilized for the production of a processed gas.

2. (original) The apparatus of claim 1, further comprising at least one heat source proximate to said flow converter to heat said carrier line.

3. (original) The apparatus of claim 2 wherein said heat source is upstream of said flow converter.

4. (original) The apparatus of claim 2 wherein said heat source is downstream of said flow converter.

5. (currently amended) The apparatus of claim 2, wherein said processed gas generator is an electrolyser electrically linked to said electricity generator for the production of ~~a~~ the processed gas.

6. (original) The apparatus of claim 5 further comprising a collection chamber in gaseous communication with said processed gas generator for collecting said processed gas.

7. (original) The apparatus of claim 6, further comprising a gas line in gaseous communication with said processed gas generator for transporting said processed gas.

8. (original) The apparatus of claim 7 further comprising compressor means, said compressor means for operable connection to said collection chamber and electrically connectable with said electricity generator.

9. (original) The apparatus of claim 8, wherein said compressor means is a mechanical compressor.

10. (original) The apparatus of claim 9, further comprising at least one heat exchanger in communication with said collection chamber for accepting said cooling stream and cooling said collection chamber.

11-23. (cancelled)

24. (original) A method of reducing pressure in a carrier line such as a natural gas pipeline and capturing at least a portion of the resultant waste energy, said method comprising expanding a pipeline gas in a carrier line, transforming the resultant mechanical energy to electrical energy, utilizing said electrical energy to generate a processed gas and collecting said processed gas.

25. (original) The method of claim 24 further comprising heating said pipeline gas.

26. (original) The method of claim 25 further comprising cooling said processed gas.

27. (original) The method of claim 26 wherein said processed gas is cooled by a cooling stream.

28. (original) The method of claim 27 further comprising compressing said processed gas.

29. (original) The method of claim 28 wherein said gas is hydrogen gas.

30-38. (cancelled)

39. (currently amended) A system for production of a processed gas, comprising:

a flow converter configured to receive a pipeline gas flow at a first pressure and deliver the pipeline gas flow at a second pressure, wherein the first pressure is greater than the second pressure;

an electricity generator in communication with the flow converter and configured to produce electrical power based on conversion of the pipeline gas flow from the first pressure to the second pressure;

a water extractor in communication with said carrier line; and

a processed gas generator electrically linked to the electricity generator and configured to produce the processed gas.

40. (original) The system of claim 39, wherein the processed gas is hydrogen gas.

41. (original) The system of claim 39, wherein the flow converter is configured to cool the processed gas based on the pipeline gas flow at the second pressure.

42. (original) The system of claim 39, wherein said processed gas generator is an electrolyser.

43-59. (cancelled)